

EXCERPTS FROM SPEECHES BY DR. HUGH L. DRYDEN

\* \* \*

"The Pathway from Vision to Accomplishment in Aeronautics"

(University of Notre Dame, November 9, 1950)

The theme: despite the complexity of modern aircraft design and construction and the necessity for teamwork by many skilled specialists, "vision," on the part of the individual, "is still the first step."

Said Dr. Dryden:

"Have you ever stopped to consider that every accomplishment of the human race must have been preceded by the vision of that accomplishment in the mind of some man or woman? Before the rough lump of marble can be transformed under the tool of the sculptor to reveal the living forms imprisoned within it, the sculptor must see these forms with his mind's eye. . . . So, too, in aeronautics. . . .

". . . The pathway was explored by many men over many generations, each new explorer contributing his new concepts and in many cases at least a partial realization. For a number of years following the first successful flight it was possible for any individual to travel the pathway in a few years of his own lifetime. He could learn and know all there was to be known about aeronautics and aircraft design. As recently as 1918, as a young graduate student I was assigned the task of

reading up and summarizing the knowledge of the physical principles employed in aeronautics. The situation soon changed. To-day it is very difficult to discover the designer of one of our modern airplanes. It is the product of a large organization of many specialists of many types, of a team. No member of the team can comprehend the final product in all its detail . . . Its development rests on the contributions of many men in the past and of many men now living. The pathway has thus become very complex . . .

“Yet in spite of the enormous differences, I still maintain that the concepts must originate in the minds of men before there can be any physical accomplishment. Even the intensive organization of specialist skills, the layout of the pathways to converge on a common goal, whether we consider a new airplane or a new airline, must itself be envisioned in the mind of some man before the steps toward accomplishment can begin. Vision is still the first step . . . “ . . . To the degree that each member of the group is a man of vision, to that degree can the accomplishments of the group far surpass the possible accomplishments of any individual. The limits of the accomplishment are set only by the size, experience, competence and vision of the group . . . ”

(continued)

"The Scientist in Contemporary Life"

(Cosmos Club, Washington, D. C., November 16, 1954)

The theme: science is by its very nature, amoral. "There is no more significance inherent in high explosives, chlorine gas or nuclear energy. . . the same high explosives can be used to destroy buildings, bridges and human beings. . ." As for the scientists, their responsibility for "the proper use of scientific knowledge for human welfare are. . . the same as those of other citizens - - no more, no less."

" . . The contributions of science to mankind need no defense or apology. We live in an amazing age of science and technology. . . Through science each of us may have the equivalent of 30 slaves sweating for him without the suffering and shame of human slavery. Each of us can rent fifty million dollars worth of telephone equipment for ten cents. . .

"The contributions of science have included not only the devising of powerful tools for altering the physical environment of man, but also they have made major contributions to our spiritual life. Science

(continued)

places a high premium on intellectual honesty and on objective truth, truth which can be tested by any man in any age. Science recognizes no arbitrary authority. It does not accept the laws of gravitation because of the authority of Sir Isaac Newton. The laws of gravitation can be observed and demonstrated as part of anyone's experience. The ethical ideals of the scientist are high. By the efficient tool of the human intellect he has penetrated the mysteries of the material universe and freed the minds of men from ignorance and superstition. . . ."

On the other hand, said Dr. Dryden, "science is a partial view of life, in many respects a narrow view. There is often no more naive or gullible individual than the scientist outside his own laboratory and discipline. . . ." However, "I believe that many scientists are now fully awakened to their moral and spiritual responsibilities. As well expressed by Robert Oppenheimer, the scientist has known sin. He has seen his greatest conquest of nature applied to kiloton and megaton bombs to destroy other men. If the scientist fails to take a hand in the decisions, there are many self-confident and ambitious men who are not hampered by too much knowledge and who will not hesitate to make decisions, not on the basis of the scientist's experience or on the basis of moral values, on considerations of right and wrong but on the basis

(continued)

of social and political expediency, or for purely selfish reasons . . .

“ . . . Scientists as well as others have come to realize that atrophy of the moral and spiritual life is inconsistent with well-rounded development. Man's life at its fullest is a trinity of activity - - physical, mental and spiritual . . . ”

\* \* \*

“Aviation as an Instrument of Peace”  
(New York City, November 29, 1949)

Theme: U. S. airpower, like the club of the policeman, is an instrument of peace.

“ . . . The people of the world long for an environment in which aeronautics can be solely an instrument of peace. . . But so long as there are human disturbers of the peace, the most important use of the airplane is as an instrument of war, rather than as an instrument of peace. Yet, is not the revolver and the club of the policeman a familiar instrument of peace in troubled surroundings? Many will think this reasoning specious and a form of rationalization. Having tried the road of disarmament once, many responsible and thoughtful persons believe that it is safer for our nation to try the road of strength, especially to develop and maintain air power. The lesson of World War II is clear - - we must not, we cannot, permit ourselves to become a second best in airpower if we wish to survive as a free people.

(continued)

"The immediate task is that of the revolver of the policeman to discourage the use of force by others because of the ability to retaliate with force on an aggressor. This is the concept behind our building of long range bombers and atomic bombs. I firmly believe that we will never start a war, but we must have the instruments of defense. The most immediately useful ones are airplanes with suitable offensive armament. They are as surely the tools of peace as any other material creation of man, if the tools are employed by peace-loving men to enforce peace. Airpower is, however, much more than a collection of airplanes growing more obsolete every minute. We are today facing a real danger in a time of shrinking budgets that this growing obsolescence will be overlooked, that the seed corn of research and development funds intended for airplanes of the future will be consumed.

"We face the necessity of providing new research facilities and of conducting new and intensive research caused by the development of the jet engine and the attainment of supersonic flight. . . . The maintenance of technologic leadership is the only hope of obtaining air power sufficient to serve as an instrument of peace. . . ."

"Space Technology and the NACA"

(Institute of Aeronautical Sciences, New York City, January 27, 1958)

Theme: The basic reason for a civilian space agency to carry on step-by-step development of manned satellites and space vehicles

(continued)

for scientific purposes is plain: "The scientific community, understandably, is worried about the possibility that the extremely important non-military aspects of space technology would be submerged or perhaps even lost if included as a mere adjunct to a military program."

Dr. Dryden called for public understanding and patience with regard to our space program and the speed of its development. "There is a long time lag between the decision and completion of the bridge, or airplane, or space craft. Like the time span between conception and birth of a child, no amount of discussion or investment of money can reduce this time interval to zero."

". . . The design and development of vehicles should proceed simultaneously with research on space technology. While the goal is manned flight to planets within the solar system, the vehicle program must proceed in stepwise fashion. . . each step fully tested.

". . . I think there will be needed two parallel lines of vehicle development, one unmanned, which should be able to proceed rapidly and the other man-carrying, whose development will probably be somewhat slower. I personally am unwilling to be a party to trying to put a brave young pioneer into orbit until his demonstrated chance of successful return is much better than 50 per cent. The earliest

(continued)

vehicles will be progressively larger unmanned satellites, carrying more and more difficult scientific and engineering tasks. We may expect these to be followed by unmanned vehicles which travel around the moon, and later those which land on it . . .”

“ . . . Since the end of World War II the NACA has been engaged increasingly in research applicable to the problems of space flight and has designed and constructed the special aerodynamic, structural, and propulsion facilities required for this work. For example, studies were formally initiated in 1952 leading to the X-15 research airplane project, a cooperative project between the NACA, Air Force and the Navy. North American Aviation is now building the X-15 and it is scheduled to make its first flight in about one year. The X-15 will be used to explore problems of manned flight into nearby space, particularly the control of the attitude of the vehicle in space in the absence of aerodynamic forces, the safe return from space to the atmosphere without destructive heating, and the effect of weightlessness on the pilot.

“The NACA is also engaged in studies of satellite configurations suitable for safe re-entry at still higher speeds, both for manned and unmanned flight. The present program is far from adequate.

(continued)



Our rate of progress in solving the problems of space flight must be very greatly increased. The problem is essentially one of extension and expansion of effort. . .

" . . . We have the talents and the resources to assure that we in America can lead the way. It is imperative, for the peace and welfare of the world, that we shall lead the way. . . "

\* \* \*

Statement of Dr. Dryden before the House Select Committee  
on  
Astronautics and Space Exploration, April 16, 1958

Theme: NACA, which has been involved in basic aeronautical research since 1915 in cooperation with the civilian aircraft industry and the Armed Forces, is the logical agency to guide civilian, scientific space research.

"On April 2, the President transmitted to Congress a special message recommending the establishment of a National Aeronautics and Space Agency. The same day, on the direction of the President, the Director of the Bureau of the Budget transmitted to Congress a draft of legislation to carry out this proposal.

"In essence, the President's recommendation is for establishment of a new, independent Federal agency that will be responsible for programs concerned with problems of space technology, space science and civil space exploration. It is further proposed that the new agency,

(continued)

which I will refer to as the NASA, will use the present National Advisory Committee for Aeronautics as its nucleus. In addition to its conduct of programs having to do with space technology, space science and civil space exploration, the NASA will continue the aeronautical research programs of the NACA."

"... The draft legislation is explicit in declaring that our national space program shall be controlled by a civilian agency, except, and I quote, 'insofar as such activities may be peculiar to or primarily associated with weapons systems or military operations. . . ' "

"... Since 1915, when it was established by the Congress, NACA has been charged with the responsibility to 'supervise and direct the scientific study of the problems of flight, with a view to their practical solution. . . and to direct and conduct research and experiment in aeronautics. . . ' Since the end of World War II, NACA has been engaged increasingly in research applicable to the problems of space flight. It has designed and constructed special aerodynamic, propulsion and structures research facilities required for this work . . .

"... A second important role of NACA since 1915 has been coordinating aeronautical research in the United States. Through the members of the Main Committee and its 28 technical subcommittees, the

(continued)

NACA has linked the military and civil Government agencies concerned with flight. The aviation industry, allied industries and scientific institutions have also been represented . . . ”

Dr. Dryden referred to proposals in 1952 that NACA set up a space flight study group: “These proposals, I remind you, were made nearly a year before man first flew at twice the speed of sound. Incidentally, that man was an NACA research pilot. These recommendations . . . for manned exploration into nearby space at speeds more than six times the speed of sound (3,960 miles per hour) have resulted in the cooperative X-15 research airplane program in which NACA has the responsibility for technical direction and in which the Air Force, the Navy, and the aircraft industry are participating.” NACA has been involved in staff studies concerned with “the problems associated with unmanned and manned flight at altitudes from 50 miles up and at speeds from Mach Number 10 (about 6,600 mph) to the velocity of escape from the earth’s gravity (25,000 mph).

“Intensive research programs were conducted at the NACA research centers to provide technical information that was essential in the undertaking of such a project. About this time, NACA’s Ames Aeronautical

(continued)

Laboratory solved the atmosphere re-entry problem for ballistic missiles. Further NACA research provided information vital in the shaping of wings and control surfaces. . ."

Concerning cooperation with the Department of Defense on space projects, Dr. Dryden said:

"I, for one, might be concerned about the difficulties that could be expected to occur in the process of determining what current and planned Department of Defense space programs should be placed under the direction of NASA were it not for the fact that for the past 43 years the Military services and the NACA have worked together, cooperatively, and what is more important, effectively. Just because we are venturing into unknown areas of interplanetary space is no reason why this happy, essential partnership arrangement needs to change."

We face the necessity of providing new research facilities and of conducting new and intensive research caused by the development of the jet engine and the attainment of supersonic flight . . . The maintenance of technologic leadership is the only hope of obtaining air power sufficient to serve as an instrument of peace . . . "

\* \* \*

(continued)

Dr. Dryden, who is active in the Man's Bible Class of Calvary Methodist Church in Washington, gives sermons periodically. Herewith are some excerpts from sermons touching upon science and religion:

"The Armament of the Christian"  
Ephesians 6:10-20  
(August 12, 1956)

Theme: "We as a Christian nation and as individual Christians have a tremendous job before us to ~~keep modern~~ our spiritual armament on a par with material weapons. In our present world, the two complement each other and each alone is insufficient. With spiritual armament alone, our national security would be lost and we as a nation would probably pass from the scene. With material weapons alone, we cannot win the peace, even though we avoid war for a time. Let us then as Christians do our part in creating the most effective armament of both types."

Dr. Dryden Quoted an Air Force chaplain, Lieut. Col. Warren E. Ferguson, who wrote in the August, 1956 issue of Air Force Magazine as follows:

"Pretend that you are a crewman on a flight to drop an A-bomb on an enemy target. What would your heart be saying? What would your mind be replying? Would you be so convinced of the moral

(continued)

righteousness of your mission that you would use all your abilities to annihilate your target?

Pointing out the failures of diplomacy and religion in dealing with "nations that substitute their own desires for moral standards," the chaplain said: "Opponents of freedom respect power. Since they defer to strength while flouting moral suasion, we must use power to attain our objectives in international relations. A potential for great power will not meet this need; living, active force, ready for use, is essential to meet current dangers. But we must apply this power in harmony with high moral principle or we will destroy the climate we seek by the methods we use. . . . Man in control of power is moral or immoral. What he does with it is far more important than what the power is. For example, a pocket knife used to kill is just as lethal within its scope of application as an atomic bomb. . . ."

Said Dr. Dryden:

"I am in agreement with his conclusions that our airpower is essential to insure a morally oriented world, that our airpower must be second to none, that it must support action for peace, and be ready and flexible to meet any challenge if war should come. . . .

(continued)

..these are the objectives of the organization with which I am associated. . ”.

“Expand Your Universe!

Matthew 13:1-17

(June 5, 1955)

Theme: just as the universe must, according to theory, expand or contract, so must the human spirit.

“Observation by astronomers of the light emitted by distant stars shows a shift in their color which has been interpreted as evidence of motion of the stars away from us in all directions. Together with the general theory of relativity these observations have led to the concept of the expanding universe, a universe growing forever larger. According to theory the universe cannot remain stationary; it must either contract or expand. The evidence is that it is expanding.

“This characteristic of the immense physical universe and, in particular the phrase ‘the expanding universe,’ has suggested a modern parable in which we consider the more limited mental and spiritual universe experienced by each one of us. By contrast, our universe may be static, contracting, or expanding. . . .

“The same ideas are applicable to our spiritual universes. We may stagnate, grow or shrivel up and die spiritually. But the essence of the teaching of Jesus requires that we grow. Our spiritual universe must be an expanding one. . . .

(continued)

"This then is the challenge that I bring to you today. . . Your spiritual universe may be contracting, static or expanding. You may rest on your oars and drift with the stream, striving to be overlooked and unseen as the opportunities for growth and service come and go, a parasite enjoying benefits to which you do not contribute. You may withdraw into yourself, avoid your fellows, become completely selfish, as the world passes you by in its growth. Or you may expand your spiritual universe by cultivating new interests, by exposing yourself to the needs of the world and its opportunities for rewarding service, by using your talents whatever they may be. To the follower of Christ there can be but one choice: to seek to grow ever more like Him. . ."

E N D

PTC / 6-17-58